

GRAZING: GETTING FROM WHERE YOU ARE TO WHERE YOU WANT TO BE

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When trying to design a forage and grazing program, producers often try to consider so many factors that it becomes mind-boggling. If basic plant physiology, how and when a forage plant grows is considered, improving a forage program will usually become easier, especially in developing a controlled grazing system. The purpose of a controlled grazing system should be to improve the utilization of the high quality forage produced on the farm. In order to improve this utilization, it is helpful to understand plant growth and quality, and the factors that affect them.

UNDERSTAND PLANT GROWTH

An important point in forage management is that forage is not always equal. Over time, the forage quality, defined as the relative amounts of protein, energy, and fiber that are present in the plant, will change. In general, as a plant becomes more mature, fiber levels will increase, and protein and energy levels will decrease. As leaves mature, fiber is laid down in the leaves, so quality will drop. Also, as a plant switches from vegetative growth (leaf production) to reproductive growth (seedhead or bloom production) the quality of the forage will decrease. This is because there is more fiber in the reproductive structures than in leaves, so the quality of the overall plant will be lower. The goal is to have a plant high in protein and energy, and low in fiber. The result will be a forage that is nutritious, highly digestible, and will provide good animal performance.

Quality vs. Quantity

For the best quality possible, forage should be cut when it is very young. This will provide young leaves that contain very little fiber and are very high in protein and energy. The problem is that the yield will be very low. To produce the largest quantity of forage possible, wait for the forage to get old and mature, with as many seedheads as possible. The problem here is that the quality will be very low. For the most efficient forage production, a mid-point should be found. The goal is to produce a good tonnage of a high quality forage. It may not be necessary to producer the highest quality or quantity, but acceptable levels of both. Figure 1 illustrates forage accumulation over time. During phase 1, forage quality is high, but tonnage is low. During phase 3, tonnage is high but quality is low. Harvesting during phase 2 should be the goal.

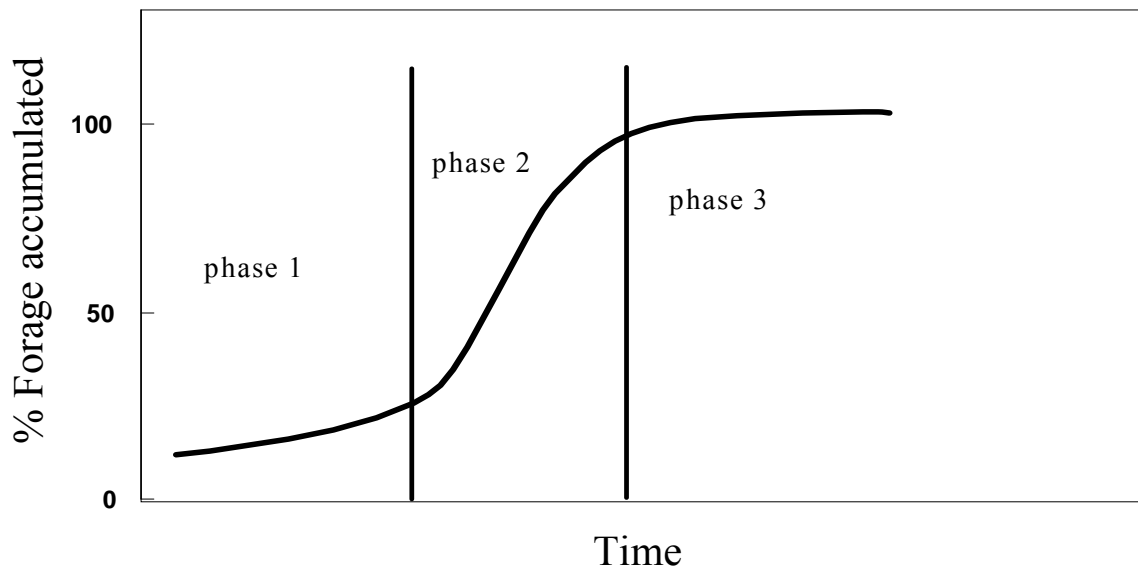


Figure 1. Phases of forage growth

Managing leaf area

One of the most important factors influencing forage growth is the amount of light absorbed by the plant. Because plants need sunlight to carry on photosynthesis, growth depends on sunlight, as long as the other nutrients are available (water, fertilizer, etc.). Because of this, the management of a plant's leaf area will influence yield. Look again at Figure 1. Early, as the plant begins to grow, there is not much leaf area available to capture sunlight. Most of the light is falling on the soil around the plant. Because of this, the growth rate during phase 1 is slow. Since the plant can't produce the energy it needs to grow, its growth is dependant on stored energy from the roots. As the leaves begin to develop, more sunlight is captured, more energy from photosynthesis is produced, and less root carbohydrates are needed. This cycle begins to build on itself. More energy means more leaf growth, which captures more sunlight, which means more energy, producing more growth, and so on. Phase 2 is characterized by a very rapid growth rate. As the plant moves into phase 3, the leaves produced during phase 2 get older, are less efficient at photosynthesis, and growth rate slows. The amount of forage accumulated comes to a halt.

Overgrazing vs. undergrazing

Figure 1 is the basis for the benefit for rotational grazing. In phase 1, the forage quality is high, but quantity is low. The plant is depending on stored energy for its growth. If a plant is forced, through overgrazing, to stay in phase 1, forage quality may be high, but eventually the plant may run out of energy in the roots, and will die. Some species are more sensitive to overgrazing than others. It is easy to kill alfalfa and orchardgrass by overgrazing, while bermudagrass and tall fescue are more tolerant of overgrazing.

If plants go into phase 3 before grazing, they are able to keep high levels of root carbohydrates, but a lot of forage matures before harvest, so efficiency is reduced. The best management is to let the plants grow into phase 2, then graze and force them back into phase 1. After they regrow back into phase 2, graze again into phase 1.

As difficult as we would like to think rotational grazing is, it boils down to this simple point: rotational grazing is used to manage the forage growth curve shown in Figure 1.

UNDERSTAND FORAGE GROWTH SEASONS

The major expense involved with growing or maintaining cattle is feed cost. Because grazing is usually the least expensive means to provide nutrients to livestock, a primary goal of beef cattle producers should be to utilize pasture for as many months of the year as possible and minimize dependence on stored feed. This sounds very simple in theory, but in reality is often difficult to accomplish.

The difficulty relates to the seasonal growth pattern for most pastures. Tall fescue is the predominant forage in most Kentucky pastures, and is most productive during spring and fall, but high temperatures and limited rainfall during the summer cause a decrease in growth (Fig.2). This fluctuation in forage production creates a dilemma for cattle producers. How many cattle can be carried on the farm? If stocking rates are based on summer forage production, excessive spring growth will result in pastures that are undergrazed, forage will mature and drop in quality, and large amounts of forage may be wasted because of selective grazing and trampling. If pastures are stocked based on spring growth, then overgrazing during summer months could damage plant stands, and result in the need to supplement the diet of the grazing animals. If stocking rates are set somewhere in between, then there will be problems in both seasons, even though they will be less severe.

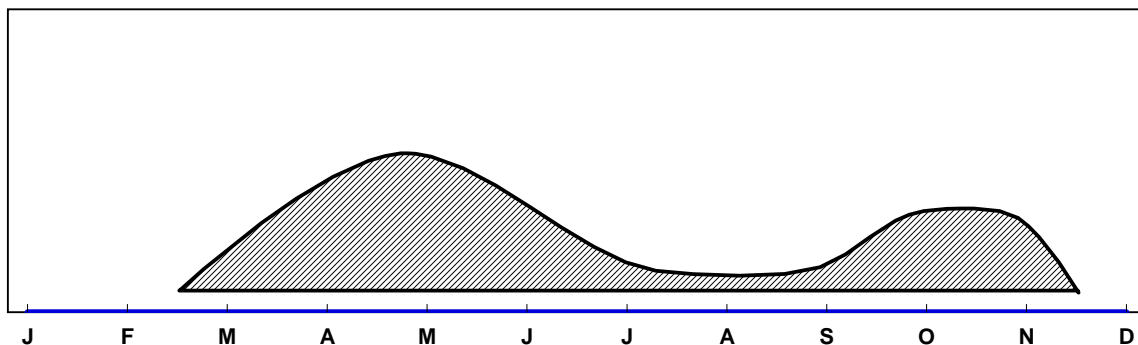


Figure 2. Yield distribution of tall fescue.

One solution to the stocking rate problem is to buy or sell animals every couple of weeks, depending on the amount of forage produced. This is not a practical solution, however, because of health and behavioral problems that invariably occur with frequent changes of this nature.

The method that can best be used to match forage production to livestock numbers is not by changing the number of animals stocked on the farm but by increasing or decreasing the amount of pasture that they have access to. This is the concept behind controlled grazing. The number of paddocks created by cross fencing may vary from only a few to 12 or more. The animals may be stocked on the paddock for 1-2 days up to a week. Size and number of paddocks, as well as the length of time livestock have access to a paddock are decisions each producer should make based on their specific situation.

USING SEVERAL FORAGE SPECIES TO FILL PRODUCTION GAPS

Even with the best controlled grazing program, a drought during the summer will cause a lack of forage production, and the potential for overgrazing. The best way to solve this problem is by adding a warm-season forage. When trying to decide which forages to use on a farm, several factors need to be considered. A step-by-step process can help make the decision a lot easier. In fact, it can often make the decision obvious. Following are the items that should be considered.

- (1) Determine your farm's current forage production curve.** Before adding any new forages, it is important to determine what are the best and worst production seasons for your farm. In general, if cool-season grasses form the base of a program, spring and fall are productive periods, while summer is a period of forage deficit.
- (2) Select forages that complement the current program.** If a new forage species is to be added, be sure that its production will improve the farm's forage availability during the time of the year when forage is lacking. If a pasture is planted to a cool-season grass, when all the other pastures are already producing during the spring and fall, the problem of poor summer production has not been helped.
- (3) Use perennials over annuals, if possible.** In general, forage from perennial pastures is more economical and dependable, with less risk of environmental problems. Establishment costs can be prorated over several years, whereas annuals must be seeded every year. A minor drought can be devastating to the establishment and production of an annual crop, while it may only reduce or delay the production of a perennial pasture.
- (4) Consider the forage quality needed by the herd.** The forage selected should be able to provide the appropriate quality for the animals on the farm. A forage that is too low in protein or too high in fiber will reduce the performance of

grazing cattle. If a forage is higher in quality than is required by the grazing animals, it will not be used efficiently. A spring-calving cow herd does not have very high nutrient requirements during the summer, so a medium quality forage like bermudagrass will be more economical than alfalfa. However, if a producer is stockering beef calves, the high quality of alfalfa may be a profitable forage because of the high nutrient requirements of these animals.

- (5) Consider the ease of management.** If all other characteristics are similar, choose the forage that will be the easiest to manage and maintain. Forages that require a high level of management to produce and persist will be more difficult to deal with than a forage that is persistent under the stressful conditions that can occur in pastures. In general, grasses are easier to maintain and require less careful management than do legumes.

For most operations in Kentucky, tall fescue is the primary forage. The ease of establishment, persistence and long production season make it an excellent species to use for cow-calf operations. The biggest weakness in forage production with tall fescue comes during the summer months. The cool-season perennial grass does not produce well during the hot, dry summer conditions. Since the summer is the period with the greatest lack of forage, a warm-season forage is the best choice for a type of species to add. Seeding a new field to orchardgrass will not help the summer forage lack, and will only add more forage during the spring and fall. If the cattle on the farm are a spring calving cow herd, minimal forage quality is needed by the cows during this period. Warm-season grasses such as bermudagrass are probably the best choices.

There is nothing magic to having a good forage program. Adding forage species to fill production gaps, and utilizing forage efficiently by controlled grazing will allow a producer to have productive, high quality, persistent stands of forage.